



Blood bank system using cloud Computing

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ABSTRACT

In the health industry, the development of technology makes all of its related activities easier and faster. Cloud computing can facilitate controlled distribution of blood by using an information system. The problems that occurs in the distributions of blood at the hospitals in India are sometimes the distributions are not controlled, so the blood may run out of stock caused by inequality of blood needs, difficulty in finding blood donors, and don't have an integrated system. The purpose of this study is to propose a connecting system that integrates Indian society who can be personal donor to help blood supply availability of UTB using BBIS (Blood Bank Management System) based on cloud computing. The research methodology is collecting data with a systematic literature review and referring to previous studies, related to the current conditions in India. The result in this study is to propose Blood Bank Information System (BBIS), featured of application dashboard module and architecture

1. INTRODUCTION

Blood bank in hospital has a very important role. Blood bank ensures that blood supply of every blood type available all the time in case it needed urgently. [1] explain the blood bank is the place where blood supply collected from blood donation event and stored properly. Generally, [2] also explain that blood bank system consists of an independent blood center which is in charge in collecting, storing and distributing human blood. Indirectly, this has become an important matter to update blood supply and distribute the blood supply for those who need it. On this case, India has significant increase of population. This population surely has high life expectancy rate. On their daily activities, accident may happen, or surgery could have been performed. Because of that, ready or not, hospital must prepare for extra blood supply. According to, blood bank or transfusion unit should be developed, tested, and evaluated on emergency situations, policies, processes and procedure to prevent, reduce, prepare, and response quickly during recovery from disasters and emergency situations itself, due to technology. Statistic shows that every two seconds, there are people who need blood transfusion. In India, in case hospital were running out of blood supply, they will make a blood request to UTB (unit transfusion Blood) after the doctor approves it. As the procedure, UTB receive their blood supply from personal donor whether it is from blood donation event or the personal donor voluntary who came to local or nearest UTB.

In all of these processes, the continuity of blood supply in the blood bank depends on three main actors. They are hospitals, UTB and personal donors. Unfortunately, in reality, there are still many cases about lack of blood supply or even their unavailability in various hospital in India. When the blood supply is low while condition is on the high demand, urgency of blood supply for patient is crucial. Delayed process could



result death of patient. Currently, the use of cloud computing has been increasing in various companies and fields. Cloud computing can be used as a place to manage data and application using a computer that has authorized access. It refers to IT services by combining hardware and software based on computer demand (request information) on an internet network with a self-service mode where any devices are used

2. RELETED WORK

On journal, it was described that the proposed blood bank system was connecting between blood bank and personal donor by sending a message to regular/permanent donor who has been registered before. On this journal users can search donor by the nearest location from them by using GPS (Global Positioning System). After the information sent, the closest donor will get an alert for blood donor needs.

Blood bank android-based application on cloud computing has been done by the previous study. Blood donor information and optimization management system also has been done by Priya et al. The Smartphone application is being developed to allow searching for voluntary donor nearby, followed by communication between donor especially on the emergency situations. In this article, Catassi and Petersen described computerized blood bank inventory. The purpose is to control the distribution of blood bank and hospital. It is possible to monitor daily blood status. Mittal and Snotra on their research explain the availability of blood supply during emergency situations is highly important for patients in need. Blood donor centre exist to fulfill this need. But whether personal donor and medical facility, there is no available media to connect them directly. That is why personal donor and the medical facility should be connected. In the other case, Ali et al propose a blood bag system. It is a web-based system which connect with the central database to control all data from the bloodbank and blood donation campaign. Basically, this system identifies donors, tests and stores blood bags, and deliver them to patients. Blood bag system supports donor and blood bank to help patients in needs of blood donation by centralized control system which can arrange all transfusion process. Every process recorded in the database. With huge data and information, Blood Bank Information System will be very useful that can be managed as decision making system.

3. METHODOLOGY

The main goal of this paper study includes development creation and implementation of an online blood management system using cloud computing. This program based on web checks the availability and records of sufficient quantity of blood bags with the hospitals to ensure smooth functioning of the portal.

Major objectives includes: -

1. To make sure the availability of blood bags at any point of time.
2. To maintain a detailed report of all its blood donors. It is not possible for donors to obtain blood from a blood bank other than the one where they have donated blood, so these types of online system makes it easier for all.
3. Enable accurate recording of the donor and their blood donation activities.
4. To identify and locate the appropriate blood bags quickly for the concerned person.
5. The working of the system starts with the creation of an account. Both hospital and receiver needs to

register on the portal first and then login with their given credentials on the login screen. The hospitals can add the blood available in their inventory on the portal and can accept or reject the blood requests placed by the user/receiver. The user can only request for the blood which the hospital has entered in the portal as available. The login details are must for any user to enter the portal and make changes. The login details are maintained inside the My SQL database with other details of the Receiver and the Hospital such as name, city, phone number, email. Admin (we who created this system) maintains and manage the entire database, delete user, manage the security of the system. If the hospital or the blood bank is facing any issue the admin can hide them from the database to avoid unwanted requests

6. Our module will be completed within 2-3 minutes.

RECEIVER'S INTERFACE

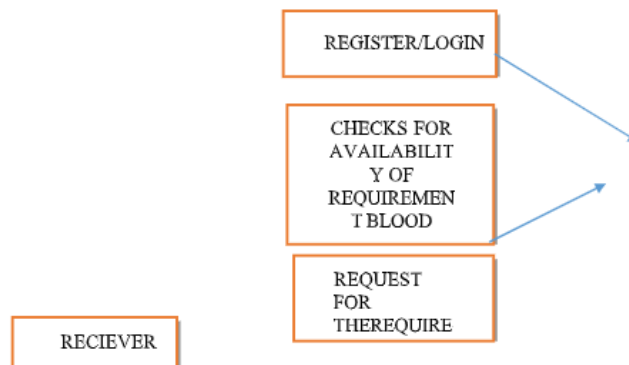


Fig.1 Receivers interface

HOSPITAL INTERFACE

- 1. Register/Login
- 2. Checks for availability of required blood group.
- 3. Request for required blood group.

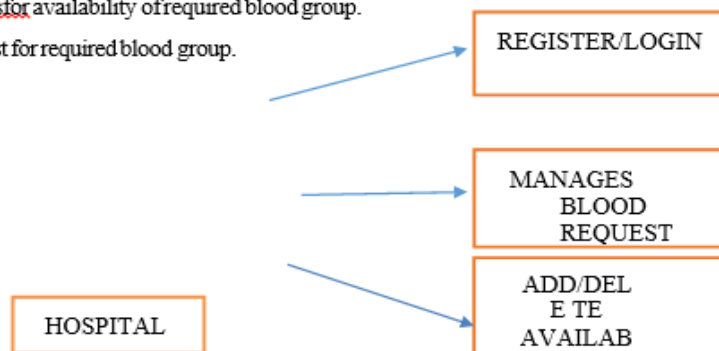


Fig.2 Hospital interface

The Hospital does the following activities:-

- 1. Register/Login
- 2. Manages blood requests

3. Add/delete available blood

ADMIN INTERFACE

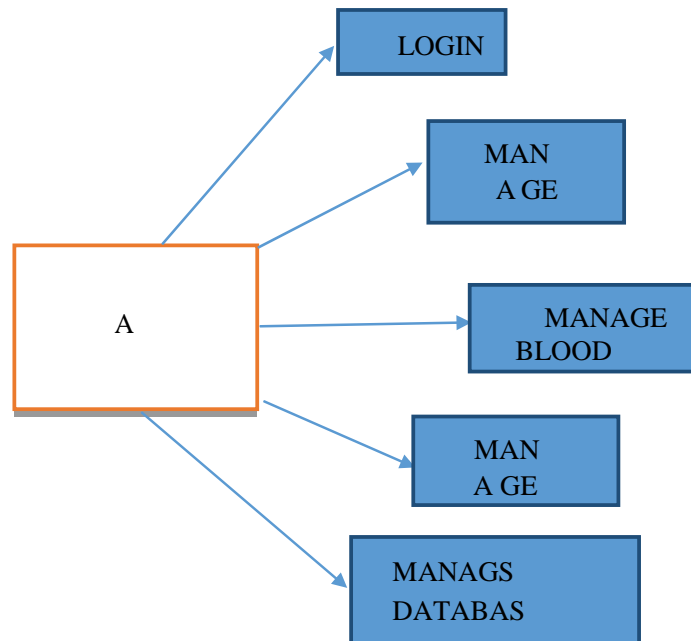


Fig.3 Admininterface

The Admin performs the following activities:

1. Login/Logout
2. Manage blood bank
3. Managedonor/hospitals
4. Manage requests for users
5. Maintain the entire database

4. RESULTS

In India, the connection between hospitals, UTB and the personal donor has not been developed yet. Hospital has their own blood bank facility to fulfill their operational needs. But when hospital running out of the specific type of blood, there are three options to get it. First, hospital can ask it from the patient's family member. Second, they can request from UTB and the third is from the personal donor. See the current system in figure 4 That's how requesting blood based on the procedure to UTB. And for personal donor who wants to donate their blood, see the figure 5 The mechanism of blood supply now is depending on blood donation event by UTB. On this situation, UTB should always organize blood donation event to restock blood supply, so in case they face emergency situation, blood supply will be available. When specific blood type is needed, hospital should check blood supply first on their blood bank and then UTB. This is inefficient because it takes more timewhen the patient is on critical condition and immediately need blood supply from UTB butthey have low or empty supply. The purpose of the system from this research is developingan application to integrate hospitals, UTB and personal donors in India. The application is using

web-based and mobile application by using cloud computing technology. As you can see on figure 6 about general display of proposed application where hospitals system, UTB system, and personal donor devices are connected by cloud computing system by using application called Blood Management Information System (BBIS)

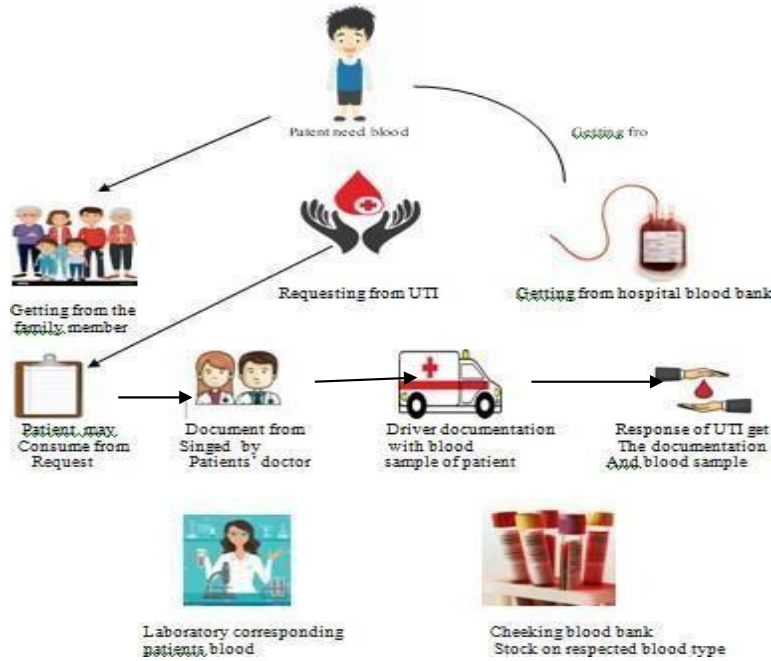


Figure 4 Current system hospital to UTB

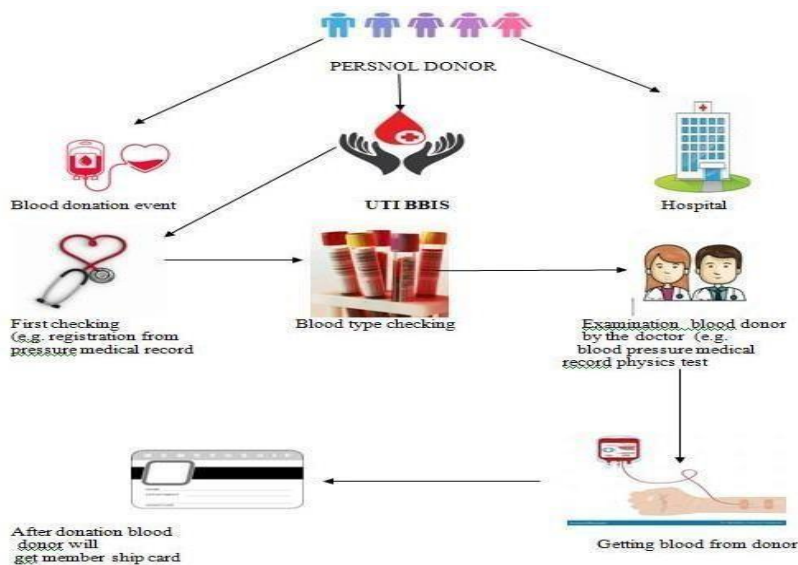


Figure 5 : Current system blood donor

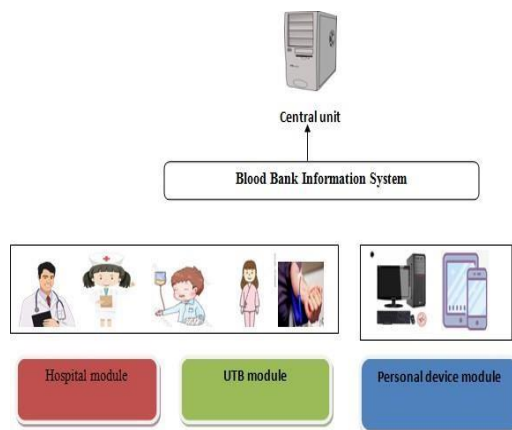


Figure 6 BBIS dashboard



Figure 7 BBIS Module

Cloud computing infrastructure

Cloud computing is a model for enabling portable and convenient on-demand network access to a shared pool of configurable computing resources, such as network, server, storage, application, and services. Cloud computing has various type of model. It can be Software as a Service (SaaS), Platform as a Service (PaaS) or Infrastructure as Service (IaaS). Model used on this research is IaaS. Developer of BBIS rent a computer as database storage and BBIS can make custom requirements such as upgrading or adding storage capacity, Random Access Memory (RAM) or even processor to increase response speed of the cloud computing. The benefit of using IaaS is the security of data on cloud computing, and then saving cost because no need to buy server or perform maintenance system. Cloud computing also accommodating data storage with large capacity, the system allocating resource can be managed easily and data or information can be provided easily to access on real time. IaaS also can be hosted for data storage. Each hospital, UTB and personal user connected through internet service to the cloud server.

This would help and increase effectiveness and efficiency of hospital or patient when blood donation is needed. They can directly check into BBIS and will get the information about blood supply they need and the nearest location they can get for the blood. The use of BBIS already answers the problem of blood supply availability on hospital blood bank. Hospital blood bank has the right access to UTB blood supply and prevent condition where it runs out or even empty.



FEATURES

- ▶ Inventory monitoring on blood bank among hospitals and UTB using application
- ▶ Requesting blood application Chatting application
- ▶ Blood donation event info
- ▶ Notification when donor needed urgently using application
- ▶ Finding nearest donor on application Managing data medical history blood donor Registration of personal donor
- ▶ Tracking selected hospitals or UTB using GPS Sharing database
- ▶ Web service and mobile service Database on cloud server

5. CONCLUSION

The purpose of this research is proposing a connecting system that integrates Indian society who can be personal donor to keep blood supply availability of UTB using BBIS (Blood Bank Management System) based on cloud computing. BBIS also can help a lot of people who need blood donor because it is easy for this application to know which people can be a donor without waiting whether a patient in an emergency situation or not. The proposed system for applying cloud computing is by using Infrastructure model as a Service (IaaS). IaaS is cloud computing which provides IT infrastructure such as data center facility, storage, server, the grid for virtualized server, and networking component on the cloud system managed by third-party. It can also be upgraded such as improvement of storage capacity, amount of RAM, the processor or even the existing network. BBIS provide access

Acknowledgements

The WHO Blood Transfusion Safety team wishes to express its thanks to the following experts in the fields of transfusion medicine and science for their contribution to the development of these guidelines.

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